

c.) Remarks*Office Action of June 2, 2005*

As of the office action of June 2, 2005, claims 1-12 are pending. Claims 1-6 are allowed and claims 7-12 are rejected. In this request for continued examination and response, applicants amend claims 7 and 10 and add new claims 13 and 14. Support for the amendments to claims and for the new claims appears throughout the specification, for example at paragraphs [0047] and [0065] and at Figures 2 and 3. As of this response, claims 1-14 are pending.

The following claim rejection has been entered; applicants respond below.

1) Rejection of claims 7-12 under 35 USC § 103(a) as being unpatentable over U.S. Patent 5,905,258 to Clemmer et al (“Clemmer ‘258”) in view of U.S. Patent 6,229,142 to Bateman et al (“Bateman ‘142”).

1. Rejection of Claims 7-12 under 35 USC § 103(a)

The examiner has rejected original claims 7-12 under 35 USC § 103(a) as being unpatentable over Clemmer ‘258 in view of Bateman ‘142. For claims 7 and 10, the examiner asserts that Clemmer ‘258 teaches all of the limitations except for the use of a time offset. The examiner asserts that the use of a time offset would have been obvious through the teachings of Bateman ‘142 because Bateman ‘142 teaches the use of a timing controller in communication with a pulse generator and a clock generator that are in communication with the ion source. The examiner asserts that it would have been obvious to one of ordinary skill in the art to apply the teachings of Bateman ‘142 to those of Clemmer ‘258 to arrive at the inventions of claims 7 and 10. With regard to claims 8, 9, 11, and 12, the examiner asserts that Clemmer ‘258 teaches that ion fragmentation can be used in or after an IMS. Applicants herein amend claims 7 and 10 to

require that the time offset be repetitively variable as described at paragraph [0047] and illustrated in Figures 2 and 3 (the exemplary time profiles of Figures 2 and 3 illustrate time offsets which vary by 5 μ s). Applicants assert that the inclusion of this express limitation, fully supported in the specification as indicated, overcomes the rejection of claims 7-12 under § 103(a) over Clemmer '258 in view of Bateman '142.

Applicants initially focus on claim 7 and 10, but the arguments provided are also applicable to claims 8, 9, 11, and 12 because these claims depend from base claims 7 and 10. Nowhere does Clemmer '258 teach or suggest the use of a repetitively variable time offset to arrive at the interleaved instrument and method of the present invention. In the previous office action, the examiner asserted that "it is obvious that the computer control (38) and grids (86, 94, and 102) act to offset the times of the generated ions that are extracted." However, nowhere in Clemmer '258 is a repetitively variable time offset taught or suggested. The lack of this teaching or suggestion in the cited references is understandable when the problems addressed by Clemmer '258 and Bateman '142 are understood. Clemmer '258 and Bateman '142 deal only with chemical inputs into a TOF-MS which are non time-varying or very slowly time-varying when compared to the "fill time" of the TOF-MS extraction plates (usually around 5-50 microseconds). Thus they do not teach or suggest an interleaved timing scheme such as that described and claimed in the instant application; non-limiting examples of such being disclosed in the instant specification (see e.g., Figures 2 and 3 and the corresponding discussion in the instant specification). Clemmer '258 and Bateman '142 do not teach this because these references are not concerned with the measurement of fast ion process, which is at the heart of the instant application. In this regard, the instant application is dealing with a different problem than are Clemmer '258 and Bateman '142. This distinction between the present invention and that of the

prior art is described in paragraph [0007] and [0008]. The present invention is an advance over the prior art in that it allows for the ability to repetitively sample time-varying inputs into the mass spectrometer whose rate of change is comparable to the filling time of the orthogonal extraction plates of the TOF-MS whether this TOF-MS is of the design of Bateman '142, of Clemmer '258, or of any other design such as that disclosed in the instant specification. Neither Bateman '142 nor Clemmer '258 teach or suggest the detection of such fast process by any method, let alone by position sensitive detection (e.g. multiple anode detector readout), or by single anode detection coupled with the interleaving described by way of example in Figures 2 and 3 (using repetitively variable time offsets) in the instant specification and the corresponding discussion, or by a combination of such interleaving coupled with a position sensitive detector.

In the last office action, the examiner asserted that Bateman '142 teaches the use of a timing controller (30) in communication with a pulse generator (22) and a clock generator (29) that are in communication with the ion source (2), and that these generators will generate pulses in such a way that bunches of ions are repeatedly ejected. However, Bateman '142 does not teach the ejection of ions according to a predetermined sequence which is defined by repetitively variable time offsets. Applicants assert that it would not have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching of Clemmer '258 so that a predetermined sequence is used and where a timing controller operates by a repetitively variable time offset. As discussed above, neither Clemmer '258 nor Bateman '142 teach or suggest this because the problems addressed by Clemmer '258 and Bateman '142 are different from those addressed by the present invention. Clemmer '258 and Bateman '142 deal only with chemical inputs into a TOF-MS which are non time-varying or very slowly time-varying when compared to the "fill time" of the TOF-MS extraction plates (usually around 5-50 microseconds).

Thus they do not teach or suggest an interleaved timing scheme such as that described and claimed in the instant application; non-limiting examples of such being disclosed in the instant specification (see e.g., Figures 2 and 3 and the corresponding discussion in the instant specification). They do not teach this because they are not concerned with the measurement of fast ion processes as is the case in the instant application.

Because the examiner's subsequent rejection of dependent claims 8, 9, 11, and 12 are premised upon the same base rejection as those for independent claims 7 and 10, these dependent claims are also patentable in light of the above amendments and arguments.

To summarize, applicants respectfully assert that neither Clemmer '258 nor Bateman '142, taken alone or in combination, teach or suggest the use of a repetitively variable time offset to arrive at the interleaved instrument and method of the present invention. Using a predetermined sequence which is defined by repetitively variable time offsets in the instrument and method taught and claimed by the applicants was not known to those of ordinary skill in the art at the time the invention was made. Accordingly, based on the amendments made herein, applicants assert that the claims are now in condition for allowance and respectfully request that the examiner withdraw the outstanding rejection.

2. New Claims 13 and 14

The arguments provided above are equally applicable to new claims 13 and 14, which claim substantially the same subject matter of amended claims 7 and 10, respectively, without the requirement of a fragmentation device or a fragmentation step. Neither Clemmer '258 nor Bateman '142, nor the combination of Clemmer '258 and Bateman '142 teach or suggest the apparatus and methods of claims 13 and 14, respectively. Support for new claims appears

throughout the specification, for example at paragraphs [0047] and [0065] and at Figures 2 and 3.

d.) Conclusions

In light of the Applicants' arguments, applicants assert that the pending claims are in condition for allowance. Applicants respectfully request withdrawal of the outstanding rejection and allowance of the pending claims. If any issues remain outstanding, please contact the undersigned for resolution of the same.

Applicants include payment for the fee for a request for continued examination and believe that no other fees are associated with the filing of this response. However, if Applicants are in error, the Commissioner is hereby authorized to charge any additional fees associated with this filing from Deposit Account No. 06-2375, under Order No. P02142US2/10102674 from which the undersigned is authorized to draw.

Respectfully submitted,

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By: 
Gino Catena
Reg. No 45,546
FULBRIGHT & JAWORSKI L.L.P.
1301 McKinney, Suite 5100
Houston, Texas 77010-3095
Tel: (713) 651-5144
Fax: (713) 651-5246